

# Archived Information

INTERAGENCY EDUCATION RESEARCH INITIATIVE (IERI)

CFDA NUMBER: 84.305W

RELEASE DATE: December 16, 2002

REQUEST FOR APPLICATIONS NUMBER: NCER-03-04

**Institute of Education Sciences**

<http://www.ed.gov/programs/edresearch/index.html>

LETTER OF INTENT RECEIPT DATE: January 24, 2002

APPLICATION RECEIPT DATE: March 14, 2003

THIS REQUEST FOR APPLICATIONS CONTAINS THE FOLLOWING INFORMATION:

- Request for Applications
- Purpose of the Program of Research
- Background
- Requirements of the Proposed Research
- Focus Areas
- Mechanisms of Support
- Applications Available
- Pre-Application Meetings
- Funding Available
- Submitting an Application
- Contents and Page Limits of Application
- Application Processing
- Peer Review Process
- Review Criteria
- Receipt and Review Schedule
- Award Decisions
- Where to Send Inquiries
- References

## Request for Applications

The Interagency Education Research Initiative (IERI) is a collaborative effort sponsored by the **Institute of Education Sciences** in the U.S. Department of Education, the **National Science Foundation**, and the **National Institute of Child Health and Human Development**, National Institutes of Health. For fiscal year 2003, the Institute of

Education Sciences is managing the competition for IERI grants on behalf of all three agencies.

To support the mission of IERI, the Institute of Education Sciences invites applications for research projects that will investigate the large-scale effectiveness of interventions designed to improve student learning and achievement in reading, mathematics, and the sciences. For this competition, the Institute will consider only applications that meet the requirements outlined below under the section on Requirements of the Proposed Research.

### Purpose of the Research Program

The goal of the Interagency Education Research Initiative is to support scientific research that investigates the effectiveness of educational interventions in reading, mathematics, and the sciences as they are implemented in varied school settings with diverse student populations. From an empirical perspective, the aim of IERI is to identify conditions under which effective evidence-based interventions to improve preK-12 student learning and achievement succeed when applied on a large scale. Research of this kind requires investigators to integrate an understanding of the predictors of learning outcomes related to specific educational interventions with a rigorous analysis of the logistical, organizational, political, and economic factors that facilitate or impede the implementation of the interventions in varied school settings. Research on scaling up also requires that collaborative arrangements with significant numbers of schools, school districts, and or states support the intent to execute and study the wide-scale implementation of a given intervention. Recognizing that particular areas of research will differ in their readiness for scaling up, IERI invites prospective grantees to submit proposals in one of two categories. *Phase I* awards provide investigators with an opportunity to prepare for broad scale-up. *Phase II* awards are for projects that are fully prepared to study the effectiveness of an intervention as implemented in significant numbers of varied educational settings. Phase I and Phase II awards must draw on interventions that have already established evidence of effectiveness.

### Background

State and local policy makers, school-level administrators, and teachers need information on how to implement interventions that lead to sustained improvements in student learning and achievement in reading, mathematics, and the sciences. In recognition of this need, IERI is designed to stimulate research capable of producing scientifically valid knowledge about the success of educational interventions as they are applied to diverse populations of students in varied educational contexts. IERI promotes research that seeks to achieve a productive integration between the standards of scientific inquiry and the realities of educational practice. IERI therefore encourages researchers to examine the context in which educators do their work, moving beyond controlled laboratory studies to ensure adaptability to classroom settings. Research that is carried out in school settings should possess the methodological features, psychometric precision, and analytic rigor

needed to generate evidence that the education community (e.g., teachers, administrators, policy makers) can use to make informed decisions.

IERI is based on the assumption that decisions to implement educational interventions on a large scale should in all instances be supported by empirically validated research that has tested the effectiveness of interventions implemented in significant numbers of classroom and schools. IERI is meant to stimulate the field to apply rigorous research methodologies to identify empirically verifiable causal relationships. For IERI, the causal relationships that are most important to understand are those that affect the success of educational interventions as they are widely implemented.

Research Focused on the Scaling Up of Interventions: Research on scaling up is defined as the systematic investigation of an effective educational intervention as it is implemented in varied educational contexts. *Systematic investigation* refers to empirical research that is theoretically justified, methodologically rigorous, and analytically sophisticated. Within scaling up studies, the reference to systematic investigation concerns the empirical investigation of both intervention and implementation level variables. For the IERI, *intervention* refers to the set of instructional practices, including assessment, and/or curricular innovations meant to bring about specific changes in student learning and achievement. *Implementation* refers to the steps taken to apply an intervention in multiple classrooms, schools, school districts, or states. *Variations in educational contexts* may include, but not be limited to, diversity of student populations (e.g., race/ethnicity, language, poverty, achievement profiles) levels of teacher expertise (e.g., content knowledge, pedagogy, qualifications and training), leadership issues (e.g., varying effects of principals, superintendents, and school boards), policy concerns (e.g., mandated testing, curriculum requirement, teacher certification), and disparities in the resources (e.g., financial, curriculum materials, technological supports) needed to support implementation.

Research designed to study the effectiveness of widely implemented interventions should consider the following as key features of research.

- **Implementation as a Substantive Topic of Investigation** - Research should identify and investigate problems of implementation. Factors /variables associated with the way in which an intervention is applied across schools, school districts, and or/states should be clearly identified and theoretically justified. Factors known to affect the success of implementations (e.g., teacher development, fidelity of implementations, competing policy mandates) should therefore be identified and measured.
- **Diverse Study Samples as a Test of Generalizability** - Research should involve large numbers of students. Such research should, over the course of the study, reflect the diversity (e.g., demographic, socio-economic) of student populations found in America's schools. The degree to which the implementation of interventions is effective among large, diverse student populations will better support claims about the generalizability of a given intervention.
- **Variation in Educational Context as a Test of Generalizability** - Research should demonstrate the conditions and critical variables that affect the success of a given

intervention. The most scalable interventions are those that can produce the desired effects across various educational contexts. As the focused study of generalizability, the study of scaling up requires that the set of variables used to define variations in educational contexts be theoretically grounded, measured, and thoroughly analyzed.

As research problems are introduced and defined, applicants are urged to draw upon the various research literatures that have identified key factors associated with the success of large-scale implementations. For example, the results of one large-scale study have suggested that teachers' attitudes and perceptions toward an intervention, school size (i.e., large or small), school level (e.g., elementary or secondary), and district encouragement and support (e.g., policies and resources) affect successful implementation and therefore should be considered in studies of scaling up (Berends, Kirby, Naftel, and McKelvey, 2001). The importance of studying levels of consistency between professional development activities and program goals have also been cited as important for investigations of scaling up (Fullan, 2000). The impact of incentive programs on implementation (Cohen, 1995), and the influence of external structures (e.g., standards of teaching practice, mandated credential requirements) that support broad implementation (Elmore, 1996) suggest other sets of variables to consider. Findings of research on educational reform conducted by Cohen and Hill (2001) demonstrated the importance of providing teachers with opportunities to study and learn about content and focus of reforms. Their work also demonstrated the value of linking teacher development activities to students' work on state assessments. Specific variables have been cited as important predictors of the success and long-term sustainability of a given intervention (Ramey and Ramey, 1998). In all IERI projects, factors identified as important for scaling up should be theoretically grounded and studied in methodologically rigorous ways (Cook, Habib, Phillips, Settersen, Shagle, and Degirmencioglu, 1999). In defining their research problems, applicants should consider how research knowledge from a variety of relevant perspectives including, but not limited to, teaching (Richardson, 2002), cognition and instruction (Carver and Klahr, 2001), school effectiveness (Goldstein, 1997; Teddlie and Reynolds, 2000), and school finance (National Center for Educational Statistics, 2002) might be integrated to develop a coherent, empirically testable set of propositions to guide the research.

### Requirements of the Proposed Research

The intervention proposed for scale up must address an area of central and broad importance to improving student learning in reading, mathematics, or the sciences. Interventions that are defined too narrowly, or that enhance learning on very specific topics (e.g., a single unit of course content), run counter to the IERI goal of supporting research on the implementation of effective and broadly applicable interventions. Research proposed for IERI support should consider the following: empirical evidence for scaling up; research methodology; interdisciplinary approach; and technology.

Empirical Evidence for Scaling up: An intervention identified for scaling up should have an associated foundation of empirical evidence upon which plausible cause and effect assertions (between interventions and student learning and achievement) can be

based. Applicants may provide an argument that such a foundation exists by: 1) presenting results from randomized studies – experimental or quasi-experimental; 2) demonstrating evidence of convergent research findings gathered from a methodologically rigorous, substantively coherent body of research directly related to the types of questions cited in the proposed study; or 3) describing results from meta-analytic studies in which the impact of an educational innovation has been measured by effect size. Expert opinions, anecdotal reports, limited case studies, or other descriptive studies (e.g., surveys, qualitative or ethnographic studies) will not be accepted as stand-alone sources of evidence in support of an intervention's readiness for scale-up. When observational, survey, or qualitative evidence is provided as support for the effectiveness of a particular intervention that is being considered as a candidate for scaling up, such evidence should be accompanied by quantitative data derived from randomized experiments or well-controlled quasi-experiments. In such instances, it will be useful for applicants to establish criteria for evaluating the trustworthiness and credibility of qualitative evidence, the transferability of the evidence, and the adequacy of the qualitative evidence in combination with quantitative data for testing hypotheses relevant to the effectiveness of a model, program, and/or strategy.

Research Methodology: IERI proposals must study student learning and achievement, and scaling up by employing research and measurement designs that are demonstrably valid and reliable. Experimental studies, with random assignment, and quasi-experimental designs are encouraged when appropriate. Randomized experiments or well-controlled quasi-experiments combined as appropriate with detailed observational, micro-genetic, survey or qualitative methodologies are encouraged. Choice of randomizing unit or units (e.g., students, classrooms, schools) must be grounded in a theoretical framework. Qualitative methodologies are encouraged as a complement to quantitative methodologies to assist in the identification of actors that explain the effectiveness or ineffectiveness of models, programs, and/or strategies. Proposals should provide research designs that permit the identification and assessment of factors impacting the fidelity of implementation during scale-up. A report recently issued by the National Academy of Sciences, entitled "Scientific Research in Education," provides general guidance about the nature of methodologically rigorous research (<http://www.nap.edu/catalog/10236.html>).

Specific methodological details that applicants must address include the following:

- **Research Design**—The applicant must provide a detailed research design and describe how potential threats to internal and external validity will be addressed.
- **Sampling**—The applicant must define, as completely as possible, the sample to be selected and sampling procedures to be employed for the proposed study. Additionally, the applicant should show how the long-term participation of those sampled would be assured. Finally, over-sampling may be needed as a strategy to compensate for sample loss.

- **Data Collection Tools**—The applicant must supply information on the reliability, validity, and appropriateness of proposed measures. If the reliability and validity of the measurement, assessment, or observational procedures are initially unknown, the applicant must include specific plans for establishing these measurement properties.
- **Interventions/Implementations**—The applicant must specify how the implementation of the intervention will be documented and measured. The proposal should either indicate how the intervention will be maintained consistently across multiple classrooms and schools over time or describe the parameters under which variations in the intervention may be described. In all instances, investigators should attempt to ground their analyses of interventions/implementations in relevant theoretical frameworks.
- **Data Analysis**—All proposals should provide detailed descriptions of data analysis procedures. For quantitative data, specific statistical procedures should be cited. For qualitative data, the specific methods used to index, summarize, and interpret data should be delineated.

Interdisciplinary Approach: An interdisciplinary approach is reflected most clearly in the types of research questions, the nature of theoretical propositions, the development of research designs—including measurement tools, and the methods of data analysis used to investigate the effectiveness of implementations. The interdisciplinary focus requires a well-articulated set of connections between the nature of a given research problem and the different disciplinary perspectives used to approach that problem. Given the complexity of the subject matter and the school settings in which educational research and practice take place, interdisciplinary research teams will be necessary to bring a wide variety of relevant knowledge and methodologies to bear on the problems associated with the scale-up of evidence-based educational interventions. It is particularly important to describe how theories obtained from different disciplinary perspectives will inform, and explain the effects of, the attempt to scale-up evidence-based interventions. Perspectives that are likely to be important for IERI's focus on scale-up include, but are not limited to 1) student and teacher cognition—including knowledge from cognitive science; 2) child development and teacher development; 3) school reform processes; 4) economics of implementations; 5) policy development and implementation; and 6) community and sub-cultural factors that affect instructional outcomes.

It is important to point out that interdisciplinary collaboration is not simply the incorporation of multiple disciplines and methods to address the research questions that are being posed. Rather, interdisciplinary collaborations proposed within projects must demonstrate how such collaborations will achieve synergy among disciplines that reflects the whole being greater than the sum of its parts. IERI project research should therefore produce well-integrated, discipline-based knowledge about successful interventions and implementations.

Technology: Technology has great potential as a critical support for scaling up. Technology encompasses a variety of electronic tools, media, and environments that can be used to enhance student learning, foster creativity, stimulate communication and collaboration among teachers and students, and engage in the continuous development and application of knowledge and skills. Technology may be used: 1) as a tool, device or environment for implementing and/or evaluating specific learning/instructional approaches and strategies; 2) for enhancing the effects and efficiency of already proven methods or strategies in traditional settings or to develop new educational methods or strategies; or 3) as a management tool in implementing proposed studies. In contrast, proposals that concentrate solely on using technology without addressing educational issues and questions relevant to the basic requirements of this Initiative will not be funded.

### Focus Areas

Reading, mathematics, and the sciences have been identified as the three focus areas in which studies of scaling up may be proposed for IERI. Applicants may propose studies in one area or in some combination of areas (e.g., reading and science for an investigation of scientific literacy, mathematics and science for an investigation of scientific problem solving skills). The following sections describe broad, educationally significant national problems in each of the disciplines. Applicants are invited to focus on such problems (or other educationally significant problems in reading, mathematics, and the sciences) to propose studies that identify the conditions under which efforts to improve student learning may succeed in varied school settings. Research supported by IERI should focus directly on student learning and achievement. Applications that call attention to variables key to the scaling up process (e.g., professional development, policy mandates, curriculum development, instructional technology) need to demonstrate how their projects serve the goal of improving student learning and achievement in one or more of the designated content areas (i.e., reading, mathematics, or the sciences). Student learning and achievement should therefore be stated as the main outcome for all IERI studies.

Reading: Scaling up research on reading should identify the instructional conditions necessary to ensure children's development of critical skills, concepts and strategies requisite to reading success. Substantial converging evidence has accrued over the past two decades that underscores the importance of several factors that must be integrated to ensure robust reading development. These factors include, but are not limited to, motivation to read, phonemic awareness, word level reading skills, vocabulary development, automaticity and fluency, and the development of comprehension strategies. However, it remains unclear how to best foster and integrate these attributes and abilities in complex "real-world" instructional settings with students who vary in cognitive, linguistic, behavioral/motivational, and academic development. While scientific progress has been made in identifying crucial instructional conditions and strategies for teaching phonemic awareness and word reading skills in complex classroom settings, evidence relevant to the instruction, development and integration of motivation to read, reading fluency, vocabulary and reading comprehension strategies along with word reading skills is only now emerging at both basic and applied levels (the

Report of National Reading Panel, 2000). The need to test, in actual school settings, the validity of newly discovered knowledge of important aspects of reading is a priority for reading research. More recently, in the RAND Reading Study Group Report, *Reading for Understanding* (2002), reading well is viewed as a long-term developmental process that differs at various points along its developmental trajectory. The endpoint, proficient adult reading, encompasses the capacity to read, with ease and interest, a variety of different kinds of materials for varying purposes, and to read with comprehension even when the material is neither easy nor intrinsically interesting. This report (<http://www.rand.org/multi/achievementforall/reading/>) concluded that defining the instructional practices that generate long-term improvements in learners' comprehension capacities and thus promote learning across the content areas are of prime importance to ensuring students' improved comprehension ability, increased knowledge, and engagement with text.

Mathematics: Many studies show that U.S. students struggle to achieve in mathematics. The Third International Mathematics and Science Study (TIMSS), and the TIMSS-Repeat Study (<http://nces.ed.gov/timss/>) reveal that students in the United States master fundamental skills and knowledge of mathematics during their elementary school years at the same rate as their international peers on average. These studies, however, indicate that U.S. students are less likely to master and/or be taught more complex and conceptually difficult material during their middle and high school years, resulting in lower achievement, relative to students from other countries. Furthermore, various studies indicate that teachers themselves frequently lack the thorough understanding of the fundamental concepts that are necessary to enable them to apply or design effective instructional strategies.

The National Academy of Sciences (NAS) recently published *Adding It Up: Helping Children Learn Mathematics* (2001). The NAS report argues for a comprehensive view of mathematics learning that the committee refers to as "mathematical proficiency." Mathematical proficiency has five strands: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. The report synthesizes the research base and highlights a number of issues that are relevant to the IERI goal to improve learning and achievement in mathematics. Among the significant issues for IERI are the following: 1) early mathematics learning and the achievement gap requires more focused research attention; 2) algebra instruction should be improved incorporating what is known from research; and 3) a focus on professional development that incorporates a more comprehensive approach to working with mathematics teachers is needed. Research on scaling up is needed in these, and other areas of mathematics education. A report recently issued by the RAND Corporation (RAND, 2002) highlighted three areas of research: 1) developing teachers' mathematical knowledge for teaching; 2) teaching and learning mathematical practices; and 3) teaching and learning algebra K-12 (<http://www.rand.org/multi/achievementforall/math/> for the full text of the report). Within any one of the areas highlighted by RAND, interventions supported by research evidence might be proposed as the focus of an IERI scaling up study. Consistent with the IERI mission, interventions identified for scale-up should be aimed at improving student learning in pre-kindergarten through twelfth grade.



Sciences: There is a critical need to improve science instruction, as the most recent results from the National Assessment of Educational Progress (NAEP) attest (National Center for Education Statistics, 2002). The findings from NAEP show that, overall, student achievement is not improving in the sciences. At the 12<sup>th</sup> grade level, student achievement has actually declined when compared with students' scores 5 years ago (National Center for Educational Statistics, 2000). Further, the Third International Mathematics and Science Study - Benchmark Study - indicates that there are great inequities in science achievement across the country. The results demonstrate that students in some schools perform among the best in the world, while students in other schools do poorly (Martin et al., 2001; National Center for Education Statistics, 1999). IERI projects can help address these serious concerns by scaling up the most powerful and promising approaches to science education—approaches for which effectiveness has been demonstrated by the accumulated evidence from research.

Several promising lines of research in science learning and teaching are candidates for scaling up as IERI projects. If scaled successfully, these projects will help meet the need to improve science achievement overall, as well as address inequities among science learners in achievement outcomes. Among the most promising lines of research, one major development is the recognition of scientific inquiry as a broad way to characterize how scientific research is carried out, and how learners come to understand science and the nature of the scientific enterprise. Another fruitful but underutilized line of research is the discovery that, in the process of trying to understand the natural world, students often develop deeply held misconceptions. Because science misconceptions are often robust, one problem faced by science teachers is how to challenge, change, or build upon the beliefs that students bring to the classroom. Another important line of research concerns the preparation of science teachers; most teachers in elementary and middle schools do not have a strong background in the sciences, and this weak preparation places limits on their ability to teach the subjects effectively. One way to improve achievement in science would be to scale up approaches to professional development that help teachers understand the relevant scientific content, as well as pedagogical approaches that deepen student understanding. Yet another promising research thread involves contrasting instruction that thematically integrates the sciences versus instruction that maintains the sciences as separate content areas. These and other important approaches to understanding and improving science achievement are worthy candidates for larger-scale interventions as part of the IERI initiative to improve learning outcomes in science.

### Mechanisms of Support

Applications submitted for review may be considered for one of two types of funding:

- **Phase I Projects**—Investigations to conduct additional empirical studies to prepare for scale-up, maximum support of \$1 million for a period of time not to exceed two years.

- **Phase II Projects**—Fully developed investigations of scaling up, maximum support of \$6 million for a period of time not to exceed five years.

Applicants must identify for which type of funding a given proposal has been submitted. Only one type of funding may be selected for a given application, and each application may be submitted for only one type of funding. Funding amounts requested should not exceed the dollar amounts specified above. Applications that exceed the dollar limits will be disqualified.

A project that is ready for scaling up can both demonstrate empirical evidence of effectiveness and document the practical preparedness required for implementing an intervention in significant numbers of schools and involving significant numbers of students and teachers. The basic distinction between Phase I and Phase II projects is that Phase II projects have amassed evidence of effectiveness and have established the technical and organizational capacity to implement the intervention across a large number of diverse educational settings. In no case will IERI support basic research to establish initial or preliminary evidence of effectiveness for an educational intervention. Further descriptions of Phase I and Phase II projects follows.

Phase I Projects: To support the development of research projects toward scale-up, applicants may request 1-2 years of Phase I funding for up to \$1million over a period of time not to exceed 2 years. Phase I support is intended for projects in which aspects of interventions and/or the technical features of the research design need further support before they can be implemented on a large scale. Phase I support is designed to provide support for three categories of studies:

- (1) **Feasibility Studies**—Support for pilot studies of scale-up that are designed to study critical implementation factors and/or to refine methodological features for scale up. Implementation factors may involve, for example, the development and testing of partnerships and inter-institutional collaborations, or the development and testing of organizational supports and strategies needed to apply the interventions in large numbers of schools;
- (2) **Replication Studies**—Studies that have demonstrated effectiveness in a limited number of settings may apply for Phase I funds to generate additional evidence to support the warrant for full scale-up (i.e., Phase II); and
- (3) **Instrumentation Studies**--Studies to develop and document the psychometric properties of instruments designed to measure predictors and outcomes critical to scaling up research. Investigators may, for example, propose to develop measures that assess the fidelity of implementations, student knowledge, teacher knowledge, or other important predictor or outcome variables related to scale-up. Phase I proposals must demonstrate how the results of Phase I activities will establish a foundation upon which a Phase II study might be conducted. If additional support is desired upon completion of a Phase I award, successful Phase I applicants may compete for Phase II funding.

Phase II Projects: The goal of Phase II projects is to take a proven intervention to scale. By sampling a variety of educational contexts, Phase II research identifies and tests the

conditions for taking an intervention to scale in multiple settings. Phase II projects may receive funds for up to five years with total funding over the period not to exceed six million dollars. Phase II projects must be ready to be moved to scale. This means the project has: 1) a theoretically oriented plan to guide the strategy, the research design, and the analysis of scale-up; 2) the practical arrangements (e.g., logistical plan, collaborative partnerships, etc.) needed for scale-up; 3) appropriate rigorous methodological approaches and measurement instruments to study scale-up; and 4) a well-formulated technology component.

### Applications Available

Application forms and instructions for the electronic submission of applications will be available for this program of research no later than February 21, 2003, from the following web site:

<http://ies.asciences.com>

### Pre-Application Meetings

IERI will hold a pre-application meeting on January 21, 2003, to discuss this program of research. Potential applicants are invited to participate and to receive technical assistance and information about the competition and program of research. The meeting will be held at the Institute of Education Sciences, 555 New Jersey Avenue, NW, room 101, Washington, DC, between 9:00 a.m. and 12:00 noon. A second pre-application meeting will be held on February 21, 2003, from 9:00 a.m. to 12:00 noon at West Ed, Board Room, 5<sup>th</sup> Floor, 730 Harrison Street, San Francisco, California 94107. Following the first meeting, a summary will be made available on the Institute's web site (<http://www.ed.gov/offices/IES>). Individuals interested in attending any of the scheduled meetings are encouraged to register by contacting Ruth Murphy, Senior conference planner with Northrop Grumman by e-mail ([rmurphy2@northropgrumman.com](mailto:rmurphy2@northropgrumman.com)) or by phone at (240-314-5229).

### Funding Available

Total combined funding for IERI from the Institute of Education Sciences, the National Science Foundation, and the National Institute of Child Health and Human Development is approximately \$48 million for fiscal year 2003. Awards pursuant to this request for applications are contingent upon the availability of funds and the receipt of a sufficient number of meritorious applications.

### Eligible Applicants

Applicants that have the ability and capacity to conduct scientifically valid research are eligible to apply. Eligible applicants include, but are not limited to, non-profit and for-profit organizations and public and private agencies and institutions, such as colleges and universities.

### Special Requirements

Applicants should budget for two meetings each year in Washington, DC, with other IERI grantees and IERI program staff. At least one project representative should attend each one-day meeting.

### Letter of Intent

A letter indicating a potential applicant's intent to submit an application is optional, but encouraged, for each application. The letter of intent is to be sent by the date listed at the beginning of this document and should indicate -- in the e-mail subject line -- the title of the program of research covered by this request for applications and the number of the request. The title and number of this request for applications are also specified at the beginning of this document. Receipt of the letter of intent will be acknowledged by e-mail.

The letter of intent should not exceed one page in length and should include a descriptive title and brief description of the research project; the name, institutional affiliation, address, telephone number and e-mail address of the principal investigator(s); and the name and institutional affiliation of any key collaborators. The letter of intent should indicate the duration of the proposed project and provide an estimated budget request by year, and a total budget request. Although the letter of intent is optional, is not binding, and does not enter into the review of subsequent applications, the information that it contains allows Institute staff to estimate the potential workload to plan the review. The letter of intent should be submitted by e-mail to:

[IES-LOI@asciences.com](mailto:IES-LOI@asciences.com)

### Submitting an Application

Applications must be submitted electronically by the application receipt date, using the ED standard forms and the instructions provided at the following web site:

<http://ies.asciences.com>

Potential applicants should check this site as soon as possible after February 21, 2003, when application forms and instructions first become available, for information about the electronic submission procedures that must be followed and the software that will be required.

The application form approved for this program is OMB Number 1890-0009.

### Contents and Page Limits of Application

The application must include the following sections: (1) title page form (ED 424); (2) budget summary form (ED 524); (3) one-page abstract; (4) research narrative; (5) references; (6) curriculum vitae for principal investigator(s) and other key personnel (limited to 3 pages each and including only information sufficient to demonstrate that

personnel possess training and expertise commensurate with their duties); (7) narrative budget justification; and (8) appendix.

The one-page *abstract* must include: The title of the project and brief descriptions of (1) the purpose of the project or the educational problem that will be addressed; (2) the population(s) from which the participants of the study(ies) will be sampled (age groups, race/ethnicity, SES); (3) the proposed research method(s); and (4) the proposed intervention if one has been proposed.

Incorporating the requirements outlined under the section on Requirements of the Proposed Research, the *research narrative* provides the majority of the information on which reviewers will evaluate the proposal and should address:

(a) Significance of the Project

- (1) Identify the educational problem that will be addressed by the study and describe the contribution the study will make to a solution to that problem.

(b) Approach

- (1) Provide a theoretical framework and review relevant prior empirical evidence supporting the proposed project. For projects in which an intervention is proposed, include a description of the intervention along with the conceptual rationale and empirical evidence supporting the intervention;
- (2) Include clear, concise hypotheses or research questions;
- (3) Present a clear description of, and a rationale for, the sample or study participants, including justification for exclusion and inclusion criteria and, where groups or conditions are involved, strategies for assigning participants to groups;
- (4) Provide clear descriptions of, and rationales for, data collection procedures and measures to be used; and
- (5) Present a detailed data analysis plan that justifies and explains the selected analytic strategy, shows clearly how the measures and analyses relate to the hypotheses or research questions, and indicates how the results will be interpreted. Quantitative studies should, where sufficient information is available, include a power analysis to provide some assurance that the sample is of sufficient size.

(c) Personnel

- (1) Include brief descriptions of the qualifications of key personnel (information on personnel should also be provided in curriculum vitae).

(d) Resources

- (1) Provide a description of the resources available to support the project at the applicant's institution and in the field settings in which the research will be conducted.

The research narrative (text plus all figures, charts, tables, and diagrams) is limited to the equivalent of 25 pages, where a "page" is 8.5 in. x 11 in., on one side only, with 1 inch margins at the top, bottom, and both sides. Double-space (no more than 3 lines per

vertical inch) all text in the research narrative. Use a font that is either 12-point or larger, or no smaller than 10 pitch (i.e., 10 characters per inch).

The 25-page limit does not apply to the title page form, the one-page abstract, the budget summary form and narrative budget justification, the curriculum vitae, references, or the assurances and certifications.

Reviewers are able to conduct the highest quality review when applications are concise and easy to read, with pages numbered consecutively.

The *budget justification* must provide sufficient detail to allow reviewers to judge whether reasonable costs have been attributed to the project. It must include the time commitments and brief descriptions of the responsibilities of key personnel.

The *appendix* must include letters of agreement from all partners (e.g., schools) and consultants. Each letter should include enough information to make it clear that the author of the letter understands the nature of the commitment of time, space, and resources to the research project that will be required if the application is funded. The appendix is limited to 15 pages.

### Application Processing

Applications must be received by 11:59 p.m. Eastern time on the application receipt date listed in the heading of this request for applications. Upon receipt, each application will be reviewed for completeness and for responsiveness to this request for applications. Incomplete applications and applications that do not address specific requirements of this request will be returned to the applicants without further consideration.

### Peer Review Process

Applications that are complete and responsive to this request will be evaluated for scientific and technical merit. Reviews will be conducted in accordance with the review criteria stated below.

Each application will be assigned to at least two primary reviewers who will complete written evaluations of the application, identifying strengths and weaknesses related to each of the review criteria. Primary reviewers will independently assign a score for each criterion, as well as an overall score, for each application they review. Based on the overall scores assigned by primary reviewers, an average overall score for each application will be calculated and a preliminary rank order of applications prepared before the full peer review panel convenes to complete the review of applications.

The 30 applications deemed to have the highest merit, as reflected by the preliminary rank order, will be reviewed by a full panel of approximately 20 individuals who have substantive and methodological expertise appropriate to the program of research and request for applications, and who served as primary reviewers for individual applications.

An individual reviewer may propose to the full panel that a particular application that does not score among the top 30 in the preliminary scoring but which the reviewer believes merits consideration should also be reviewed. The panel will decide whether to review any such application.

All members of the peer review panel will be expected to review the 30 applications being considered by the panel. Following presentations by the primary reviewers and discussion by the full panel, each member of the peer review panel will score each application, assigning a score for each criterion, as well as an overall score. In addition, reviewers will indicate whether or not an application is recommended for funding.

### Review Criteria

The goal of Institute-supported research is to contribute to the solution of educational problems and to provide reliable information about the educational practices that support learning and improve academic achievement and access to educational opportunities for all students. Reviewers will be expected to assess the following aspects of an application in order to judge the likelihood that the proposed research will have a substantial impact on the pursuit of that goal. Information pertinent to each of these criteria is also described above in the section on Requirements of the Proposed Research and in the description of the research narrative, which appears in the section on Contents and Page Limits of Application.

- Significance (importance of the addressed problem, contribution of project to solution of the problem)
- Approach (conceptual rationale, hypotheses or research questions, measures, research design, analytic methods)
- Personnel (qualifications of project staff)
- Resources (support at applicant's institution and at field settings)

Strong applications for IERI grants clearly address each of the review criteria. They make a well-reasoned and compelling case for the significance of the project and the problems or issues that will be the subject of the proposed research. They describe an approach (e.g. orientation to the problem, research design) that is complete and clearly delineated, and that incorporates sound research methods. In addition, the personnel descriptions included in strong applications make it apparent that the project director, principal investigator, and other key personnel possess training and experience commensurate with their duties. Descriptions of facilities, equipment, supplies, and other resources demonstrate that they are adequate to support the proposed activities. Commitments of each partner show support for the implementation and success of the project.

### Receipt and Review Schedule

Letter of Intent Receipt Date: January 24, 2003  
Application Receipt Date: March 14, 2003

Peer Review Date: May 15-16, 2003  
Earliest Anticipated Start Date: August 1, 2003

### Award Decisions

The following will be considered in making award decisions:

- Scientific merit as determined by the peer review
- Responsiveness to the requirements of this request
- Performance and use of funds under a previous Federal award
- Contribution to the overall program of research described in this request
- Availability of funds

### Direct your questions to:

Dr. Mark A. Constan  
Program Director  
Institute of Education Sciences  
U.S. Department of Education  
Washington, D.C. 20208  
E-mail: [Mark.Constas@ed.gov](mailto:Mark.Constas@ed.gov)  
Tel: 202-219-1373  
<http://www.ed.gov>

Finbarr Sloane  
Program Director  
Research, Evaluation and Communication  
Education and Human Resources  
National Science Foundation  
Arlington, VA 22230  
E-mail: [fsloane@nsf.gov](mailto:fsloane@nsf.gov)  
Tel: 703-292-5146  
<http://www.nsf.gov>

Dr. Daniel B. Berch  
Program Director  
Child Development and Behavior Branch  
National Institute of Child Health and Human Development  
National Institutes of Health  
Bethesda, MD 20892-7510  
E-mail: [berchd2@mail.nih.gov](mailto:berchd2@mail.nih.gov)  
Tel: 301-4020699  
<http://www.nih.gov>

### References



- Berends, M., Kirby, S., Naftel, S., and McKelvey, C. (2001). Implementation and performance in New American Schools: Three years into scale-up. Santa Monica, CA: Rand Education.
- Carver, and Klahr, D (2001). Carver, S. M. and Klahr D. (Eds.) (2001) Cognition and Instruction: 25 years of progress. Mahwah, NJ: Erlbaum
- Cohen, D. (1995). Rewarding teachers for student performance. In S. Fuhrman and J.O'Day (Eds.) Rewards and Reforms: Creating Educational Incentives that Work. San Francisco, CA: Jossey Bass.
- Cohen, D. and Hill, H. (2001). Learning and policy: When state education reform works. New Haven, CN: Yale University Press.
- Cook, T., Habib, F., Phillips, R., Settersten, S., Schagle, S., and Degirmencioglu, S. (1999). Comer's school development program Prince George's County Maryland: A theory-based evaluation. American Educational Research Journal, 36, 543-597.
- Elmore, D. R. (1996). Getting to scale with good educational practices. Harvard Educational Review, 66, 1-25.
- Fullan, M. (2000). The return of large-scale reform. Journal of Educational Change, 1, 1-25.
- Goldstein, H. (1997). Methods of School Effectiveness Research. School Effectiveness and School Improvement, 8, 369-395.
- Martin, M., Mullis, I., Gonzalez, E., O'Connor, K., Charostowsky, S., Gregory, K., Smith, T., Garden, R. (2001). Science benchmarking report, TIMSS, 1999- 8<sup>th</sup> Grade. International Association for the Evaluation of Educational Achievement. Chestnut Hill, MA: International Study Center, Lynch School of Education, Boston College.
- National Center for Education Statistics (2002). Developments in school finance. 1999-2000. Washington, D.C.: U.S. Department of Education.
- National Center for Educational Statistics (2001). The National Assessment of Educational Progress. Washington, D.C.: U.S. Department of Education.
- National Center for Educational Statistics (2000). The National Assessment of Educational Progress. Washington, D.C.: U.S. Department of Education.
- National Center for Educational Statistics (1999). The National Assessment of Educational Progress. Washington, D.C.: U.S. Department of Education.
- The National Academy of Sciences (2001). Adding it up: Helping children learn mathematics. Washington, D.C.: The National Academy Press.

- National Reading Panel (2000). Teaching Children to Read: An evidence-based assessment of the scientific literature on reading and its implications for reading instruction. Washington, D.C.: The National Institute for Literacy.
- RAND Math Study Group (2002) Mathematical proficiency for all students: Toward a strategic research and development program in mathematics education- Draft report. Santa Monica, CA & Washington, D.C.
- RAND Reading Study Group (2002). Reading for Understanding: Toward an R&D Program in Reading Comprehension. Santa Monica, CA & Washington, DC: Rand Corporation
- Ramey, C., Ramey, S. (1998). Early intervention and early experience. *American Psychologist*, 53, 109-120.
- Richardson, V. (Ed.) (2002). Handbook of research on teaching (Fourth Edition). Washington, DC: American Educational Research.
- Stokes, D. (1997). Pasteur's quadrant: Basic science and technological innovation. Washington, D.C.: Brookings Press.
- Teddlie, C. & Reynolds, D. (2000). The International Handbook of School Effectiveness Research. London: Falmer Press.